GARDEN AND FOREST.

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The National Forest Reservations.

CERTAIN western Senators are strenuously demanding the revocation of Mr. Cleveland's proclamation on the 22d of February, which established the great forest reserves on the Government lands. It is not likely that they will fully succeed, but some amendments to the Civil Sundries Bill are now before the Senate as a sort of compromise. The excuse is offered for attempting to legislate in such an unusual way that the wants of miners and settlers are immediate—that they need firewood and fencing and the right to build roads to their mines. This is true, but no one is suffering, and the fact is that the property of no one except the Government is threatened. Beyond question, some way of adjusting the rights of individuals and of the Government must be devised, but it is notorious that every effort to protect the public domain in these transactions by the agents hitherto appointed by the Secretary of the Interior has failed. Our defective land laws, inadequately and insufficiently enforced, have produced the inevitable result of making the inhabitants of the public-land states and territories look on the public domain as their own personal property. Few men in the west consider that they do wrong in cutting timber or pasturing their domestic animals on public land, and any attempt to check them is considered an infringement of their vested rights. At present there is but one way in which the reservations can be protected from fire and theft, and that is by military control. Of course, the troops should not be used permanently, and what is needed is the authority from Congress for the Secretary to organize a quasi military service of permanent trained forest officers to protect the reservations and carry out such rules and regulations as he may make for their administration.

A year ago the Secretary of the Interior, appreciating the gravity of the situation, and desiring more information than he possessed on the general forest situation in the west, asked the National Academy of Sciences for advice in the matter. A committee of experts was appointed by the Academy to consider the whole question, and during the past year it has devoted itself assiduously to this work. The report and recommendations will be in the hands of the Government in a few days, and it seems at least unwise to legislate on such an important question before the information collected by the highest scientific body in the United States and the scientific adviser of the Government can be utilized. The legislation proposed by this committee, together with the report accompanying it, will be before Congress early next month, and in order to inform the Secretary of the Interior of its leading features the committee addressed to him on the 5th of April a letter, which we publish entire as a matter of record, and to show how carefully the rights and privileges of actual settlers have been considered:

To the Honorable
The Secretary of the Interior, Washington, D. C.

Sir,—The legislation relating to reserved forest lands of the public domain which the Commission of the National Academy will recommend in its final report, now in course of preparation, provides for the following:

First, that authority be given to the Secretary of War to make details of troops, at the request of the Secretary of the Interior, to protect temporarily, and until a forest service is organized, the property of the Government in the forest reservations from fire and trespass, and to enforce such rules and regulations as he may make for their care.

Second, the establishment of a permanent Forest Bureau in the Department of the Interior, composed of trained officers, to administer, maintain and improve the reserved forest lands.

Third, the appointment of a Commission to institute as rapidly as possible, under the supervision of the director of the Geological Survey, topographical surveys of the reservations and determine what portions of them should be permanently reserved on account of their forest covering and what portions should be reopened to entry and sale.

Fourth, to authorize the Secretary of the Interior to issue the necessary rules and regulations for the protection, growth and improvement of the forests on the reservations, for the sale of timber, firewood and fencing from them to actual settlers in and adjacent to the reservations and to owners of mines legally located therein for use in such mines; for granting permits to sawmill owners to enter the reservations for the purpose of manufacturing such lumber as may be sold to actual settlers in and adjacent to the reservations and to the owners of mines located therein; for allowing actual settlers who have no timber on their own claims to take from the reservations firewood, posts, poles and fencing material necessary for their immediate personal use; for allowing the public to enter and cross the reservations; for granting to county commissioners rights of way for wagon roads in and across the reservations; for granting rights of way for irrigating ditches, flumes and pipes, and for reservoir sites; and for permitting prospectors under such rules and regulations as he may from time to time establish to enter the reservations in search of valuable minerals.

The Commission will recommend that the reservations be opened to the location of mining claims under the general mineral laws, and that the owners of valid mining locations in the reservations made and held in good faith shall be permitted to fell and remove from their claims the timber growing on them for actual mining purposes in connection with the particular claim from which the timber is cut. It will also recommend that the owners of unperfected bona fide claims or patents of land included in the forest reservations shall be permitted to relinquish their claims to the Government, selecting in lieu tracts of vacant land open to settlement, but not exceeding in area the tracts covered by their claims or patents; and that the owners of such unperfected claims shall not be subjected to additional charges for entries or record, and that credit shall be allowed them for the time spent on the relinquished claims. The Commission will also recommend that the Secretary of the Interior be authorized to enter into negotiations with the land-grant railroad companies for the purpose of concluding agreements by which these companies may relinquish

to the United States the title acquired by them to lands within their granted and indemnity limits when these lands lie within the boundaries of forest reservations, and may accept other unappropriated lands in exchange from the even-numbered sections within their granted and indemnity limits not included in forest reservations.

Very respectfully,
your obedient servants,
(Signed) C. S. Sargent,
Henry L. Abbot,
W. H. Brewer,
Arnold Hague,
Gifford Pinchot.

The Red Cedar.

THE Red Cedar is a familiar tree to almost every American, since it ranges from Cape Cod to Vancouver's Island and from Canada to Florida. At the north it is found on uplands, cold, dry and hungry, while in Florida it inhabits swamps which are covered with water for a considerable portion of the year. In the deep bottom-lands of Arkansas and Texas it is a noble tree, sometimes a hundred feet high, with an irregular trunk buttressed at the base and often four or five feet through. In the fertile valleys of the middle Atlantic states, when it has opportunity for full development, it is a broad-topped and dignified tree, while on the low limestone hills of northern Alabama and the neighboring states it is small and bushy, and on dry ridges, both in the west and in the east, it is little more than a shrub, and often fairly prostrate. The habit of the tree varies as much as its size, and one who is accustomed to see its pyramidal form with sharp spire-like top would hardly recognize it on the seacoast with its short, stout trunk and stiff horizontal branches which have developed under the stress of Atlantic gales. This wide variety means that it adapts itself to all sorts of surroundings and that it can live almost anywhere throughout an immense geographical range.

It need hardly be stated that the Red Cedar is really not in any botanical sense a Cedar, but a Juniper (Juniperus Virginiana), one of ten species found in the United States. Besides these there are from twenty to twenty-five other Junipers in the northern hemisphere, scattered from the arctic circle to the highlands of Mexico and the West Indies in the New World, and to Africa and southern Japan in the Old World. Of the American species the Ground Cedar, or common Juniper, crosses the continent from Greenland to Alaska and extends through northern and central Asia and Europe, so that it is altogether the mostly widely distributed tree in the northern hemisphere. Many garden forms of this species are known in cultivation, some dwarf, some with colored foliage, some of compact habit, some columnar, and others with pendulous branches. Among these a fastigiate form, called in nurseries the Swedish Juniper, is the best known in the gardens of this country. Another Juniper is confined to Texas and portions of Mexico, and there are half a dozen more which belong to the Pacific side of the continent and the forests of the Rocky Mountains. The Red Cedar is the largest and most useful of all the American Junipers. In some of the swamps of western Florida and in certain other places in the south its wood is formed with a singularly straight grain, which is soft and easily worked, and so completely adapted to the requirements of lead pencils that it is almost exclusively used in their manufacture. Its fragrant odor is repellent to moths, so that cedar-lined chests and closets are in universal use for storing woolens. It is so durable in connection with the ground that it is the best tree we have for fence-posts or the sills of buildings, and its rich color, its durability and its pleasant fragrance make it useful in many kinds of cabinet-work. But while its economical value has been always understood, its use in horticulture has been comparatively limited. Large quantities of these trees were raised some years ago for hedge-plants in the west, but they did not prove acceptable for this purpose. This was not only because the Red Cedar grows slowly, but the branches of the tree have a habit of dying when they come in contact with those of another tree, so that it is not as good for this purpose as the Arbor Vitæ. It endures shearing quite as well as any other tree, however, and since there seems to be a tendency now to try the fashion of formal gardens in the northern states, there is no tree so well adapted to take the place filled by the Cypress in the gardens and southern Europe. But, even if it is not mutilated in this way, the tree in any of its forms fits naturally into an American landscape. When grown in rich soil, with an opportunity to expand, in a sheltered place it will make a dignified and stately specimen, and where a cylindrical or spire-topped tree is needed nothing better than the Red Cedar can be found.

The natural form of these trees on a cold New England slope is seen in the picture on page 145, which represents them as every one knows them in a winter landscape at the north. Here is the perfection of careless grouping and a grace of individual form which the dullest eye can at once perceive. Why a more extended use has not been made of the Red Cedar in park planting is difficult to understand, since it would be invaluable in certain positions. It is objected to the tree in winter that the foliage turns to a dull brown, but really the bronze color is in perfect accord with the tone of the whole landscape. The cheerful green of certain conifers is effective, too, under certain conditions, but in very cold weather the leaves of most species turn dark, and, indeed, any light green seems out of place in a season when there is no growth in vegetation. We associate the green with active life; it is the color of spring and summer, and we naturally expect that trees with persistent leaves will show in some way that they are in a state of suspended animation. There has been so little demand for Red Cedars that nurserymen do not keep them in large quantities, although they are very easy to raise from seed. There is little difficulty, however, in transplanting young trees from old pastures, where they spring up from the seeds dropped by birds. These long lines of Red Cedars along fence rows are conspicuous features in the landscape of the older settled parts of the country, and their effectiveness in such situations and upon the slopes of rocky hills and on the summits of knolls ought to convince every one of their usefulness in planting parks and private grounds large and small.

Mature White Pine in Pennsylvania.

TRACTS of uncut White Pine in Pennsylvania are few in number and of restricted area. It is doubtful if there are in the state to-day half a dozen tracts of 2,000 acres in extent in which the White Pine occurs in sufficient quantity to give character to the forest. One of the best of the large tracts is the property of Mr. John Du Bois, and is located near the town of that name in the north-western part of Clearfield County. There remain here about 1,500 acres of uncut Pine, but the merchantable timber of all sorts is being systematically harvested. The Pine, as is the case in all the mature timber of the state, occurs as scattered individual trees in a mixed growth of Hemlocks and hardwoods. In some places Hemlocks are entirely absent, while again they are the prevailing trees. So, too, within the space of half a mile one may find a heavy stand of Pines and an area where few of the trees occur.

The yields of two acres were measured in the Du Bois tract and illustrate this varying stand of Pine. The two sample acres were less than a mile apart, and in general the character of soil and moisture supply were similar—a clay loam overlying laminated shale, well-watered by little brooks which led into Narrow Creek. In both areas the Pines were the tallest trees, with a second story of Hemlocks having a slight admixture of hardwoods.

In one acre there were 37 White Pines, ranging in diameter, at breast-high, from fifteen to forty-five inches; 84

Hemlocks, more than six inches in diameter, and 179 smaller Hemlocks; 11 Beech and Red Maple more than six inches in diameter, with 221 smaller hardwood trees. In addition to the small Beech, Maple and Birch trees, there were Dogwoods, Cucumber-trees, a few masses of Laurel, etc., making a moderately dense undergrowth. The other acre had a much more open and irregular stand, with scanty undergrowth of hardwoods and shrubs. It contained 23 White Pines of the same size as those in the first acre, 37 Hemlocks, and 74 hardwoods (Beech, Maples and Birches) over three inches in diameter. The first of these two sample areas contained Pine of the finest quality and size. It was found to range in age from 230 to 260 years. Seventeen of the largest Pines were carefully measured after being cut into logs, and contained above 40,000 feet, board measure, the largest tree measuring more than 4,300 feet, board measure. The average length of trunk to base of crown in thirty trees was 91 feet, the longest trunk free of limbs being 112 feet, while the tallest tree on the acre was 158 feet high. The total contents of thirty of the trees on this acre was found, by Scribner's rule, to be above 60,000 feet, board measure.

Many single acres could be found equal to the one here cited, though it is much above the average yield of the entire tract. The White Pine in this particular locality is tall and straight, with comparatively short crown. In much the greater part of the tract the Hemlock is the prevailing tree, and in the limited areas where the hardwoods predominate the White Pine is of less frequent occurrence, with greater crown development, thus giving a relatively smaller yield of the best timber.

Washington, D. C. *Charles A. Keffer.*

Burdock as a Vegetable.

THE well-known definition of a weed by Emerson as "a plant whose virtues have not yet been discovered," is confirmed by the better agricultural authority of Schwerz, according to whom "a weed is a plant of which the direct uses are unknown to man." Both the poet-philosopher and the scientific farmer implicitly admit, I think, that as man brings more and more of nature under his control—in other words, as he brings more and more plants under cultivation, many of them, hitherto scorned as weeds, must cease to be considered as such. I have often seen ridiculed the Chinese custom of eating birds' nests, bears' claws and other incomprehensible delicacies, but I cannot help admiring the power of pantophagy on the one hand and the refinement of culinary skill on the other, which can convert into means of human enjoyment things apparently worthless and revolting. If, as philosophers say, civilization consists mainly in bringing natural forces under man's subjection, China must be given a high place in the scale of civilization from a culinary point of view.

Is it not a real triumph of art to extract food for man from so coarse and ugly a weed as Burdock? Most books on botany in the English tongue describe Burdock, Lappa major or officinalis, as a pestiferous weed, and many an agricultural bulletin gives careful instruction how to destroy it. Perhaps the only use that has been made of Lappa in America is for medicine. The root contains a bitter principle, a resin and tannin, and it is said to have an aperient and diuretic effect. It also has some reputation as an alterative in constitutional blood diseases, and the readers of Garden and Forest may have used the so-called "Burdock tea." In Germany, where the three species, L. major, L. minor, L. tomentosa, are widely spread, they were formerly much used as medicines under the name Radix Bardanæ; and they are even now regarded by some as good blood purifiers. Perhaps from the burr of the seeds the plant has the repute of power to stimulate a rich growth of hair, and an extract for this purpose is made from the roots. The peasants of the south of England use the roots as an antiscorbutic, and the leaves are employed in making a green elder ointment for the use of farriers.

All these medicinal uses are not to be despised, but they are unimportant when compared to the value of the plant as an edible vegetable; since the kitchen is more important than the drug store, the cook is nearer our hearts than the apothecary. Even in England the alimentary value of Burdock was not always despised. Sowerby writes in his *Useful Plants of Great Britain*, "The stalks of the Burdock, cut before the flowers open and stripped of their rind, form a delicate vegetable when boiled, similar in flavor to asparagus. In the raw state they may be eaten with oil and vinegar as salad. They were sometimes candied with sugar in the time of Bryant, as those of Angelica are. They are slightly laxative, but are perfectly wholesome. The roots of the plant are mildly diuretic and diaphoretic, and have been used with advantage in gout, rheumatism and calculous complaints. The decoction of the root is generally employed, but the seeds and leaves possess nearly the same properties, though the latter are slightly purgative. The bruised leaves are applied by the peasantry in some districts, in cataplasms to the feet, as a remedy for hysterical disorders."

In Japan, Burdock grows wild in several places, but it is also extensively cultivated as a vegetable. Every one knows and eats "Gobo," the usual appellation for this plant, although a more refined and almost obsolete name is "Kitakisu"; sometimes it is called "Uma (horse)-fuki (Nardosmia)." It is familiar to the Ainu under the name of "Seta (dog)-korokoni (Nardosmia)." Both the Ainu and the Japanese prefixes, "seta" and "uma," when applied to plants, seem to have much the same sense as the English "dog," in dogwood, dogbane, etc., and the "horse" in horse-radish, horse-chestnut, horse-mint, etc. The Ainu use it as food as well as medicine. They boil the tender shoots with beans, and the roots are put into soup. For medicinal uses the young leaves are softened by rolling them between the palms, and applied to skin eruptions. The Japanese esteem Lappa for similar purposes. It is used in many preparations for its medicinal properties, which, they believe—at least, the old-fashioned empirics believe—consist in counteracting the action of some kinds of poisons. Grated and made into pulp, the roots are applied as a poultice in eruptions of the skin. But by far the more important use is made in the kitchen. As regards this plant we have outstripped the pantophagous Chinese, for they have not raised the plant to the dignity of a market vegetable. "When young," says a Chinese book on botany, "the tender leaves of the Lappa are cut and eaten as greens; the roots may be boiled or steamed and eaten, but people nowadays rarely use the plant." Among the Japanese, however, it has been under cultivation for years, and possibly for centuries. It enters the kitchen of every household, not being ostracized from the menu of the most high-toned restaurant. Thousands of acres are devoted to its culture. Official statistics for 1888 give the total production of Lappa in the country at about seventy-two million pounds, valued at 422,134 yen. The roots average 350 grains in weight.

The production of so large a quantity is not at all to be wondered at when we recollect that Lappa ranks high in the scale of nutritive plants. In the amount of nitrogen it stands higher than potatoes, beets, carrots or turnips; in fact, few roots or tubers approach it. I append here its chemical composition, as compared with some other commonly used vegetables:

	H_2O	N.	Ash.	K_2O	Na_2O	CaO	MgO	P_2O_5	SO_3	SiO_2	Cl.
Potatoes	750	3.4	9.5	5.8	0.3	0.3	0.5	1.6	0.6	0.2	0.3
Sugar beets	815	1.6	7.1	3.8	0.6	0.4	0.6	0.9	0.3	0.2	0.3
Turnips	920	1.8	6.4	2.9	0.6	0.7	0.2	0.8	0.7	0.1	0.3
Carrots	850	2.2	8.2	3.0	1.7	0.9	0.4	1.1	0.5	0.2	0.4
Burdock	738	5.6	10.5	4.3	0.2	1.1	2.0	0.9	0.7	0.1	..

So important a crop as Burdock has, of course, many varieties developed, but the best known among them are few in number. They are usually named from the localities where they were first developed or where they thrive

best. A variety known as the Takinozawa, raised chiefly near Tôkyô, has a slender root, about four feet long, and is of very fine quality. In the vegetable market of Tôkyô it commands a respectable price. The Owura variety, so named from a small place in the province of Shimosa, where they produce only about two thousand roots a year, attains the huge size of one and a half feet in circumference and two and a half feet in length; this kind is sold at the rate of about twenty sen (a sen being a hundredth part of a Japanese dollar) apiece. In its form this variety is like the beet. The two kinds most popular in the markets of Kyoto are the Yamato and the Horikawa; in fact, these seem to be only different names of the same variety.

In raising Lappa much attention is naturally devoted to the right selection of the soil. It is a common belief among cultivators that a light sandy soil is specially adapted to it, and it is true that roots grown from such soil are long and slender, but they are prone to be hollow at the centre and rather tough at the rind. A stronger and deeper soil, say clayey loam, seems to impart firmness to the root and a better flavor. To gain the most satisfactory results, the soil must be plowed deep and finely pulverized, or else an undue amount of labor will be required in harvesting the roots. Indeed, digging Burdock is a proverbially hard task; it has become almost a fine art to do it well. Many an old writer recommends digging the soil to the depth of some four or five feet, and then putting in green leaves, stalks, turf, and so forth, in a layer of a foot deep, and covering that with the earth that was excavated. The surface must then be well hoed in both directions. So much care, however, is only necessary when exceptionally fine specimens, for show or otherwise, are aimed at. One peculiarity of Lappa is that it is not adapted to rotation—that is, it thrives better if planted continuously on the same soil; in new land the roots are likely to become forked. It is also grateful for good manures—compost, night-soil, and especially to rice-bran—but if compost is applied it must be well decomposed, or else the roots will throw off too many branches.

When the soil is properly prepared seeds are planted in rows three feet apart, five or six seeds being placed every six to eight inches in a row. In Owura, the usual time for sowing is the early part of May or late in April. Before the early part of June the young plants are thinned out, leaving but one in the hill. Very often liquid manure is applied two or three times before the roots are harvested late in December. Another method is to plant the seeds in August, so as to have the vegetable ready for spring use, in which case they are sown more closely, since they do not grow as vigorously as those planted in spring. Lappa is a slow grower and takes over two hundred and twenty days to mature. Seeds retain their vitality for five years, and many a gardener asserts that the best crop is obtained from those three years old. They say that new seeds produce roots which throw off too many branches and flower-stalks. This statement, however, is not always verified. For keeping and marketing, the vegetable may simply be left where it was grown or kept buried in the earth like beets or turnips.

I am aware that a discourse on Burdock will be of little interest to Americans unless it contains some information regarding the mode of using it, but it must be remembered that Japanese cuisine differs widely from the American. I need only state in general terms that, after their skin is scraped or peeled off, the roots may be sliced into long strips or cut into pieces of less than an inch in length, and boiled with soy, salt or Spanish pepper, to impart savor to them; or, if boiled alone, they may afterward be browned in sesame oil, which of itself will flavor them. Another common way of cooking them is to scrape off the outer skin and cut them into pieces about two inches long, then, when they are boiled soft, to take them out of the pan and mash them; then make them into cakes, much as you treat oyster-plants. A kind of salad, though not uncooked, is also made of them. A rather unique and more elegant process consists in stuffing the roots with sea-eel, and boiling them, after dipping them in a preparation containing soy and pepper. Slices of lappa fried and eaten with some condiments form one of the commonest dishes with us. The roots are sometimes pickled in miso. There are many other ways of preparing this valuable vegetable for table use, but a longer description would be interesting or amusing only to the curious. Each country has its own Victua to inspire it with oracles in the mysteries of national taste and national cookery. American housewives will naturally turn to a Mrs. Lincoln or a Mrs. Rorer for inspiration on this score, and I may forbear further gastronomic dissertation concerning our plant.

Sapporo, Japan. *Inazo Nitobe.*

Plant Notes.

Lilium pardalinum.

THIS is another of the Turk's Cap Lilies, and is nearly related to Lilium superbum of the Atlantic coast of North America. Lilium pardalinum is found throughout the Coast Range, the Sierras and the Cascades, from Mono County, in eastern California, and San Luis Obispo County on the coast side, to the British Columbian coast, and northeast to Lake Winnipeg. I lack information as to whether it extends farther in southern California, or exists in the high ranges of Nevada and Arizona. As it extends east of the Rocky Mountains to Lake Winnipeg it must exist in at least the northern Rocky Mountains. I should appreciate any information with regard to its distribution in these regions.

Lilium pardalinum is usually called a bog Lily, though not altogether correctly. As a matter of fact, while it is found frequently in bogs or wet places, it more often makes its home in open moist meadows, in a sandy soil rich in alluvium, or in deep alluvial deposits along the banks of mountain streams. The bulb, as it is convenient to call it, although it is properly a rhizome, is a curious and interesting study. It may be described as a thick fleshy rootstock, covered closely with one, two or three jointed, closely overlapping scales, which break off easily. Generally, the young rhizome terminates in two or three buds, each of which produces a stalk the succeeding year. As each of these growing buds will in like manner produce from one to three growing bulbs (for lack of a better name) the following year, it is evident that in a term of years very large clumps will be formed. Again, as each growing bulb is produced at an angle to the axis of the growth of the preceding year, branches of the intricate, ramifying rhizome are soon turned around and cross the earlier growth. In this way incredibly large clumps are formed. The rhizome branches two or three deep; the interior ones are compressed and starved, the exterior growing bulbs strong and vigorous, and the entire mass easily traceable to the original parent. The older rhizome becomes yellow, the new growing bulbs are white, and by the scars left on the rhizomes by the succeeding stalks many years' growth can be traced. I have frequently seen masses of from fifty to two hundred growing bulbs, while I once found over five hundred in a single clump on a hillock in a bog. The vitality of the rhizome is great, and pieces cut from the old rhizome will form bulbs. Where a rich, loose soil permits the fullest development, a clump of L. pardalinum bulbs is really beautiful. The size, shape and the jointing of the scales vary greatly in different kinds, and although not strictly reliable in their characteristics are an aid in determining the species. Some forms of L. pardalinum usually produce but one terminal growing bulb, and in such forms no clumps are produced and the rhizome is long and zigzag.

This Lily grows readily from seeds or scales, and is but little subject to disease. In earlier days it grew in wonderful profusion in some of our mountain meadows, and there are still numerous out-of-the-way places where it treats the hunter or mountain climber to gorgeous displays of color.

Mr. Luther Burbank, the well-known hybridizer, many years ago secured some bulbs of Lilium pardalinum near

the geysers in Sonoma County, California. From seedlings of these, selections were made, which on arriving at maturity were cross-fertilized, and this process was repeated several times. I saw a field of the last crosses, and parallels could be seen of nearly every native form of L. pardalinum, with giant and dwarf, one-flowered and many-flowered forms which nature had never attempted. Mr. Burbank firmly believes that not only all of our varieties of L. pardalinum, but all other Pacific coast Lilies, have a common parentage and have diversified in obedience to environment, and in support of his belief adduces the ease with which all can be hybridized. In this connection I take the liberty of quoting Mr. G. Reuthe, the able superintendent of the Thomas S. Ware Nurseries, in London, on the same subject: "Lilium pardalinum seems, in my mind, the easiest for crossing, and I have not the slightest doubt, judging by these results obtained under the most unfavorable circumstances, that most of the so-called species are natural varieties." If Nature, unaided, has not been quite so lavish of her forms of this beautiful Lily as when assisted by so expert a cultivator as Mr. Burbank, she has yet been overbountiful in varieties of L. pardalinum, and I long ago gave up trying to fit them to published descriptions. In identifying or, more correctly, in attempting to identify the many forms which I have met in seventeen years of mountaineering, I had the advantage of Dr. Wallace's *Notes on Lilies*, which is undoubtedly the best guide, and includes Mr. J. G. Baker's *Synopsis of Lilies*. In addition to this, Dr. Wallace some years ago favored me with colored drawings of the varieties of this Lily, according to his work. I have seen plants which approximated these descriptions and drawings, but I have to confess that I have seldom seen or grown lots of this Lily which I could unhesitatingly refer to either variety. It is a peculiarity of many variable species of Liliaceæ on our coast, that while in a given locality a vast number of specimens vary within well-defined limits, scarcely two localities have the same type. As this is true of L. pardalinum, it is plain to be seen that, although a description based on a large number of specimens, all drawn from the same locality, may seem to its author quite definite, it becomes of little value when, by a wide acquaintance with localities, we find an endless chain of types varying to one side or the other of the published description. In such a species we may, like Mr. Burbank with his seedlings, select some form of unusual merit which we can maintain by propagation or by continuously collecting from the same locality. From the florist's point this is the proper thing to do. I fear that we will never be able to divide L. pardalinum into botanical varieties which the field botanist can follow.

Mr. Baker in his synopsis mentions variety Californicum, variety puberulum and variety Bourgaisi. In *Botany of California* the type and variety angustifolium are mentioned, and variety minor has also been described, I think, by Baker. The Lily which has been sold incorrectly for some years as Lilium Roezlii is a form of L. pardalinum. L. Roezlii proper is different. Some of Luther Burbank's seedlings have been named, and the Thomas S. Ware Nurseries, in London, originated and named several hybrids of L. pardalinum. Of these L. pardalinum, var. luteum, is L. pardalinum × L. Parryii. L. pardalinum, var. carmmatum, is L. pardalinum × L. maritimum. Mr. Burbank's beautiful hybrids of L. pardalinum on many species have not, I believe, yet been disseminated. In every way the species is extremely variable. I have seen it growing where stalks from seven to nine feet high were common. Four bulbs transplanted from this lot to my garden (a heavy clay loam) produced stalks the first year nine feet high, with from twenty-three to twenty-five flowers on each. Low-growing forms are not uncommon, but under favorable conditions five to seven feet is the ordinary height.

To give any accurate idea of the forms colored plates should accompany descriptions. In default of these I pass

Fig. 17.—Red Cedars in New England.—See page 142.

to the forms in which Lilium pardalinum borders on other species. L. pardalinum, var. minor, is the connecting link with L. parvum, and being more nearly related to L. parvum I will treat it with that species.

In Lilium Wareii, as figured and described, we have a species which bears every indication of being the connecting link between L. pardalinum and L. Parryii. It is a clear yellow Lily, revolute as in L. pardalinum, fragrant as in L. Parryii. It has a rhizome which clumps up as in L. pardalinum, and comes from a region where L. Parryii is the common bog Lily. I think it not unlikely that it is a natural hybrid.

Lilium pardalinum and L. maritimum can be hybridized readily artificially, but, although in some spots the two grow together, I have never seen anything suggestive of natural hybridization.

Lilium Humboldtii and L. pardalinum grow in the same belt of the Sierra Nevada for hundreds of miles, and although L. Humboldtii is a Lily of the hillsides, and L. pardalinum of the meadows and stream-banks, they are frequently found close together. I have found but one Lily which even suggested a hybrid. That was in the Bear Valley, mentioned by Dr. Bolander, where a meadow of hundreds of acres was once full of a form of L. pardalinum. This is a grand form of the Lily, very heavy and strong, with flowers in which the scarlet scarcely shows at all. My first thought on seeing them was one of wonder that L. Humboldtii should grow in such a place.

Lilium Roezlii was first described by Regel. Mr. Baker gives as its locality "Rocky Mountains in Utah, introduced by Roezl into European gardens," also in Santa Cruz Mountains, California. It gradually disappeared from sight in Europe, and its very name became a synonym or was appropriated for a form of L. pardalinum. Two years ago a collector in southern Oregon wrote me asking if I wished L. Parryii, and the fresh flowers he sent proved to be a Lily plainly identical with the original L. Roezlii. It flowered freely with me last year, and I find it quite distinct. The bulb is close to L. pardalinum, but with little tendency to form clumps. The stem and leaves are pale, much as in some varieties of L. pardalinum. The flowers are colored exactly as in L. Humboldtii, but are more revolute, and the capsule is like that of the latter or L. Columbianum, and very unlike L. pardalinum. It grows beyond the range of L. Humboldtii, but both L. pardalinum and L. Columbianum grow in the same region, and it is a good medium between the two.

Lilium pardalinum is easily cultivated. The idea that it is a bog Lily has, perhaps, kept many from trying it. As a matter of fact, it is as easily grown in any good garden loam as potatoes. It does not like a soil that is sour and heavy, nor a very light sandy soil, but any fair loam, either sandy or clayey, suits it, and it will stand some manure. As to moisture it is not particular. I have often seen it in ground which becomes quite dry in midsummer. The ideal situation for it is in deep, loamy, well-drained soil close to running water, where its roots can extend down to moisture. It is a Lily to which every flower-lover should give a trial, and in eight cases out of ten it will be a success.

Ukiah, Calif. *Carl Purdy.*

Cultural Department.

Southern Californian Ferns.

THE Ferns of southern California are especially noted for their beauty and grace. The California Gold Fern, Gymnogramme triangularis, is probably the most widely and favorably known species in cultivation, while the Silverback, or Bronze Fern, as it is sometimes called when old, is a close second in point of popularity. These are both easily grown, at least more easily than some other of our species, which is the main reason for their greater favor with amateurs.

Adiantum emarginatum is a special favorite of mine. It lacks, perhaps, the grace of A. Capillus-Veneris, or the Maidenhair Fern of the eastern states (which also occurs in California), but possesses a richer coloring and beauty of habit peculiar to itself. It grows in dry situations with the Gold and Silver Ferns, while the Maiden-hair Fern with us is restricted to perennially moist banks or cañons.

The Cheilanthes and Notholænas are a distinctive group of Ferns, adapted to a dry climate and able to stand long periods of drought. California and Mexico are both rich in species belonging to these genera—species that captivate the eye of the tourist, but, alas, are seldom responsive to the culture given them by the amateur. Yet they may be induced to grow and flourish by a skillful hand even years after they have been dried and placed in the herbarium.

The Lace Fern, Cheilanthes Californica, is one of the best known of southern California species, and perhaps the easiest of successful cultivation. The Cotton Fern, Notholæna Newberryi, is scarcely less favorably known to the tourist, and is most frequent in the composite productions with which he returns laden to the east. Cards with elaborately produced pictures, made from dissected Mosses and Ferns, are as familiar souvenirs of the west as the feather pictures brought away by the Mexican tourist.

Cheilanthes Clevelandi, a Lip Fern of more local distribution, is rarely seen in cultivation, and seldom enters into California Fern work, except from San Diego. Outside of San Diego its place is occupied by Fendler's Lip Fern, Cheilanthes myriophylla. It grows at a higher elevation in the mountains, but is scarcely more susceptible to cultivation.

On the confines of the inhospitable Colorado Desert, in cañons dry throughout a large part of the year, where the scant vegetation is subjected to intense heat, often about 140 degrees, Fahrenheit, we find Dr. Parry's Cloak Fern, Notholæna Parryi, Cheilanthes viscida and other Ferns, including what I believe is now properly called Notholæna cretacea (referred to in most works as N. candida). They are all small-growing species, the Cheilanthes seldom over six inches high, and the others with fronds only two to four inches long, as a rule.

The Chain Fern of our mountains, Woodwardia radicans, forms a striking contrast with its immense fronds, sometimes measuring ten feet in height, deep in the shade of some ravine with a perennial stream of water beneath its almost tropical luxuriance.

Pteris aquilina and Adiantum pedatum (the latter rare) are two Ferns which are equally at home in the mountains of California and of New England, and with the local variety incisum of Asplenium Trichomanes, our Feather Fern, are the principal species of our Fern flora not closely restricted in distribution.

Aspidium munitum, Polypodium Californicum and several species of Pelæa are peculiar to west America, the latter known as Tea, Wire and Cliff Brakes, locally.

Ophioglossum nudicaule is a dwarfish Adder's-tongue Fern, first found by Dr. C. C. Parry in southern California in 1850, and then lost sight of until 1884, when he was the first to rediscover it on our mesas in early spring.

Woodsia Mexicana is a rare Fern which I have occasionally found in the mountains of Baja California, near our boundary. We have a few other species, of interest to a botanist, but, I believe, entirely unknown in cultivation and not worthy of special mention.

San Diego, Calif. *C. R. Orcutt.*

Ouvirandra fenestralis.

IN the Royal Botanic Gardens at Edinburgh this singular aquatic, commonly known as the Lattice, or Lace Plant, has been very successfully grown for the last twenty-five years. It was started by the late James McNab, who had a happy knack of hitting the right treatment for many newly introduced plants. Since its introduction many specimens have measured over four feet in diameter; the plants flower annually, the seeds ripen and float on the surface of the water where they germinate in a few days after ripening. Seedlings are, however, hardly worth bothering with when old plants are available for the purposes of propagation, as they take too long to make fair-sized specimens. The plants at Edinburgh are grown in shallow oak tubs, about five feet in width; they are placed on a row of hot-water pipes in one of the warmer houses where the temperature of the water seldom falls below sixty-five degrees, Fahrenheit, and ranges from that figure to eighty degrees. The surface water is agitated about three times a week by adding a little water with the hand-syringe. Care is taken to keep the plants shaded from the sun, and when any confervoid growth appears on the leaves the light is excluded for a day or two at a time by means of a tarpaulin drawn over the tops of the tubs.

By imitating those conditions we have been enabled to grow the Ouvirandra into quite large specimens in the gardens here;

its greatest enemy is confervæ, which will adhere to the leaves whenever there is a sufficient amount of light, but with a heavy shade on the glass of naphtha and white lead this growth can be kept in check. The plants will throw larger leaves when they are shaded from direct sunlight. In places where it is not desirable to have shading, the common Azolla pinnata grown on the surface makes an excellent substitute, but this has to be brushed aside in order to see the Ouvirandra. The soil for fairly large plants should consist of loam finely sifted three parts, and one part made up of broken charcoal, fine gravel and rotten cow-manure. At potting time this should be mixed and put in a condition which would be considered too wet for potting ordinary plants, so as to prevent the mass from softening in the pot after it is placed in the water. The surface of the pot should be finished off with light-colored gravel or broken rock in order that the fine network of the leaves may the more easily be seen. The pot should be just low enough in the water to insure the covering of the leaves, and no more. Should the leaves become covered with sediment of any sort the plant should be taken out and the leaves syringed, one person holding the leaf-blades flat against the hand while another manipulates the syringe. Ouvirandra is most easily propagated by dividing the crowns; one fair-sized offset should make eight or ten breaks within a year. The plant dislikes sudden changes in the temperature of the water, and if subjected to such treatment it is almost certain to lose its older leaves, and those which are growing do not attain their full size.

Botanic Garden, Washington, D. C. *G. W. Oliver.*

Notes from the Botanic Garden of Smith College.

THE raising of seedlings is one of the most important and one of the most interesting operations of botanic garden work, especially where large numbers of species are included. We have some seven hundred species germinated from seed sown this spring. Two-thirds of these are intended for the beds (which are planted in families) outside, while the remainder are greenhouse species and Cacti. To accommodate this number it is important to raise them in the smallest possible space. To this end we sow almost all our seeds in four-inch pots, one species in a pot. We have found this size to be best adapted for the purpose, a size larger being cumbersome, while in a size smaller the soil dries out too rapidly. The tropical species and Cacti are raised in the propagating-house, which is kept at a temperature of about seventy degrees. The hardy and cool greenhouse species are raised on the north side of the warm temperate house, on a temporary stage, which brings them as near the glass as possible. We have found that hardy perennials germinate much better in a temperature of fifty-five degrees than in a cooler temperature. We use a light rich soil, made very fine and porous on the surface. For the Cacti the pots must be well drained, and we usually mix a little powdered charcoal with the surface soil, and also a little more sand than for ordinary seedlings, as they have to remain in their seedling pots for one year at least, and often three years, according to the genus. Cereuses and Opuntias may be potted off singly in one year, while the slow-growing Mamillarias, Anhaloniums, Echinocactus, etc., require two years at the least before they are sufficiently rooted to pot singly.

All the seedlings require careful watching in regard to watering especially, and if any show signs of damping they must be transplanted into fresh soil at once, and this is generally a preventive. As we only require about eight plants of each of the hardy perennial seedlings, we transplant them into two other four-inch pots as soon as they are large enough to handle; these by the end of May are of suitable size for planting, either in their permanent position or in nursery lines for fall planting. This method of raising seedlings, I think, might be employed with advantage commercially, for as many as two or three hundred seedlings of some species may be germinated in a single four-inch pot.

Northampton, Mass. *Edward J. Canning.*

Rose Hybrids.

ROSA WICHURAIANA is a plant probably familiar to most of the readers of Garden and Forest, since its peculiar characteristics and merits were first noted in its columns. The general garden public has had its attention more especially called to it lately under the name of the "Memorial Rose." It is doubtful whether superintendents of trimly kept cemeteries have welcomed it as a boon, for it is a great rambler and not a plant to be allowed over grass. On sandy, bare soil where few things will grow, or over sloping banks or rocks, it is very valuable and effective, being not only a rapid, vigorous grower, but perfectly hardy in the worst seasons. Its thick, smooth leaves are little subject to insect pests. Its principal value for ordinary positions, however, would be for use as a pillar Rose, a class of plants for which purpose we have comparatively few varieties that make very long growths and are entirely hardy. The fragrant, beautiful clusters of the single white flowers leave little to be desired. It seems to hybridize readily, and Mr. W. A. Manda, of South Orange, New Jersey, has secured a lot of charming hybrids which have all the merits of the parent plant in hardiness and vigor, and have in addition a great variety of flowers. Mr. Manda has made crosses with a number of tender Roses, mostly Teas, and has secured flowers which are single, semi-double and very double, and white-pink and dark pink (or rose) in color. Last week in Mr. Manda's propagating-house there were some of the double-flowered plants which had been lifted, cut back and forced into bloom. This variety, known as "Manda's Triumph," has a snow-white flower with petals perfectly imbricated and about two inches in diameter. They grow in clusters of twenty-five to fifty or more blooms. One of the prettiest of these hybrids is a single-flowered pink one, known as the "Roamer." There is also a variety which has only a slight suffusion of pink in the white.

These are not forcing Roses, however, and I was drawn to South Orange mostly to see how the plants had wintered in the open, where they had been exposed on a sandy bank. Plants said to be hybrids with Madame Hoste and Meteor had old growths in some cases twelve feet long, and these were alive for their full length; in fact, the plants seemed entirely unaffected, except in some soft late growths, and these in some cases were not entirely lifeless. These hybrids seem to me an interesting and valuable genus.

Elizabeth, N. J. *J. N. Gerard.*

Bamboos in Florida.

THE most striking and interesting features in many Florida gardens are the immense clumps of Bamboos. Planted with the charming evergreen Magnolia, the striking Camphor Tree and such Palms as the massive Phœnix Canariensis or Cocos Australis, they always command attention by their distinguished appearance.

While on a visit to Florida last November and December I paid special attention to the different species of these giant Grasses found in cultivation. The tourist gets the first glimpse of them while crossing the southern parts of Alabama and Georgia. On both sides of the railroad track there are to be seen in moist ground almost impenetrable masses of our native Arundinaria macrosperma. In the lower Mississippi valley, as far north as southern Illinois and Indiana, immense stretches of the low ground are covered with these "cane-brakes." The first specimens of the more ornamental Asiatic species I found in the St. James Park at Jacksonville, Florida. I frequently occupied a bench underneath a few broad spreading Hollies, Ilex apoca, about twenty feet in height, to enjoy the beauty of a magnificent clump of Arundinaria Japonica, Bambusa metake, scarcely seven yards away. This plant is about twelve feet high and twenty feet in diameter, forming a semi-globular mass of the densest and richest green imaginable. The stems, which are highest and strongest in the centre, are not crowded in a mass around the root-stock, but they stand from one to two feet apart. Every stem stands upright and is furnished two-thirds of its length with broad evergreen foliage. All the culms clustering around the plant are smaller and shorter than those more in the centre. Mocking birds and many of our feathered winter sojourners, like juncos, white-throated and white-crowned sparrows, catbirds, etc., find exceedingly congenial and safe retreats among this mass of green. This particular specimen is so beautiful that it is worth quite a journey to see it. Having been planted five years ago it was killed to the ground during the great freeze on February 7th, 1895. At present it is as beautiful as ever. There are several smaller specimens in the same ground, which in a few years will have attained the same proportions. Several plants of Bambusa argentea (probably B. verticillata) do not look as promising, and B. vulgaris is not at home so far north.

The most beautiful as well as the largest Bamboos were seen in the gardens of Orlando, over a hundred miles farther south. The species commonly met with is the large unarmed Bamboo of Bengal, Bambusa vulgaris, usually called the Giant Bamboo. Everywhere in the charming subtropical gardens in the town it forms masses of noble aspects. When well established, heavily fertilized and frequently watered, it grows at such a rapid rate that in the course of about five or six years immense clumps thirty to fifty feet high, and as much in diam-

eter, are formed. Several specimens are known whose stems have reached their full height of over seventy feet in sixty days. The first growth of canes is usually made by the middle of July. All the buds that start after the middle of September perish, and no more growth is made until the following July. The culms in their first season stand erect with few branches and with only terminal leaves. The second season they feather out and become heavy with foliage, curving over gracefully to all sides. During the disastrous freeze of February 8th, 1895, all the specimens of this Bamboo were killed to the ground, but they pushed up new shoots in July, and at present no trace of the frost is visible. Clumps forty to sixty, and even seventy, feet high, and as much in diameter, are very picturesque. All the stems are crowded together around the root-stock, the exterior ones especially arching over to all directions by the heavy weight of the dense mass of foliage. In one of the larger gardens where grand masses of Bananas, a great clump of Alpinia nutans, about ten feet high, immense specimens of Pampas Grass, and a fine tree of the common Date Palm surround it, this Bamboo is at least sixty or seventy feet high, the immense culms gracefully arching over, covering at least a space of a hundred feet in diameter. This clump stands on low ground and near a hydrant, where it is frequently watered during dry weather. The abundant, large, velvety foliage of this species has a slight trace of yellow in its green color, which gives it a distinct individual quality. It never forms suckers at any distance from the root-stock like most of the species of Phyllostachys, which become a nuisance when not constantly watched and kept within bounds.

Bambusa arundinaria, the Thorny Bamboo of India, is almost as beautiful as B. vulgaris, and it grows much in the same manner. As its stems are stronger they stand more erect and do not arch to all sides. At a distance a small specimen looks much like a gigantic Tree Fern. It is not as yet a common species in the gardens, and there are only a few specimens planted a few years ago that have attained a height of scarcely twenty-five feet. There is a pretty specimen on my place on high Pine land that is very promising. The prospects are that in a few years hence this species will rival in beauty and size the Bambusa vulgaris.

Dendrocalamus strictus is an exquisite species of gigantic proportions. Of late years it has been distributed over many parts of the state with Bambusa arundinacea by the wide-awake firm of Reasoner Brothers, of Oneco, Florida. As it flourishes to perfection on high and dry Pine land it is of particular value. The species is difficult to propagate, and therefore it will only become more abundant in the course of time. All the specimens I have seen were young plants, but in a few years they will have grown into gigantic clumps. The strong culms are crowded together around the root-stock, and they are scarcely arching over on the sides. Like the two foregoing, this species is strictly tropical, young unprotected plants having been killed outright when the mercury fell as low as nineteen degrees, Fahrenheit, on February 7th and 8th, 1895. It is said to be one of the mightiest Bamboos in existence, reaching a height of over one hundred feet in its native country, India. It has not been grown long enough in Florida to say with any certainty what size it will acquire.

The most common Bamboo in the gardens of Florida is Bambusa argentea and its variety, B. argentea striata (probably this is B. verticillata). I have found many magnificent specimens even in the gardens of the backwoods. The leaves of the type are of a rich green, with a glaucous underside, while in the variety they are prettily variegated with creamy white. Specimens twenty feet high are frequently met with, and the root-stock of such is estimated to weigh several tons. All the canes are crowded together, arching over on the sides near the ground. In the centre they all stand upright. The tops of the stems are not furnished with masses of foliage like the foregoing species; in fact, in the upper half the foliage is rather scant, the density of the plant being lower down. It is a plant of great beauty, though much less ornamental and refined than the foregoing species. It grows well on high dry Pine land, but there its leaves are of a rather yellowish hue.

Thamnocalamus Falconeri (Bambusa falcata), from the Himalaya region, I have only seen on my own place in Orange County. It is a small but exceedingly beautiful plant, rarely growing more than ten or twelve feet high and as much through. Its thin slender stems are densely clothed with small Fern-like foliage of a beautiful light velvety green color; the underside of the foliage has a glaucous hue. In my garden I have also the following species:

Phyllostachys violascens, P. Nigra, P. aurea, P. viridi-glaucescens, P. Castillanis and Arundinaria Simoni, all desirable species. Though planted several years ago, they have not made large clumps as yet, but some of them have sent suckers to all directions, so that my man has difficulty to keep them in bounds. Like most Japanese plants, they appear to be perfectly at home in Florida, and they would have formed strong specimens were they planted in moist rich soil. Phyllostachys Nigra has jet-black stems, and Arundinaria Simoni, which grows thirty feet high, is distinguished by its many fine branches and dense masses of small variegated leaves. A part of my grounds near the beautiful small Lake Audubon, where the soil is deep and moist, has been set aside for a Bamboo garden. Those planted out already flourish admirably.

There are quite a number of other beautiful tropical Bamboos which should be introduced by our enterprising nurserymen. To do their best, Bamboos need much water and a very deep rich soil. They need heavy fertilizing, and should be mulched each year with a thick layer of stable manure.

Milwaukee, Wis. *H. Nehrling.*

Correspondence.

Notes from West Virginia.

To the Editor of Garden and Forest:

Sir,—By a very natural error in punctuation I was made to say in No. 476 of Garden and Forest that such plants as Saponaria ocymoides, hardy Candytufts and Creeping Phloxes were a mass of bloom in my garden late in March. What I meant to say was that these plants were masses of healthy evergreen verdure. Even in the earliest of springs I have not seen any of these plants in bloom before the middle of April, and up to this time (April 8th) none of them have shown a flower. We have now, however, enough early bloom to make the garden bright and to repay richly all our care. The most conspicuous ornaments of the home grounds at present are some fruit-trees, planted for their beauty and also to screen outbuildings, in which latter position they have evergreens for a most effective foil and background. The first of these to flower were the Hard-shell Almond-trees, which are not often planted for ornament, but which are very charming when used in this manner, as they have large pale pink blossoms very early in the season. These were quickly followed by the Nectarines and Apricots. The bloom of all these trees comes before the leaves, and therefore the background of evergreen foliage is necessary to bring out their full beauty. A large old Plum-tree planted close to the south side of the house was two days later than the Almonds in flowering. I do not know the name of this Plum, which is at least twenty-five years old. It bears no fruit, but at blossoming time it covers itself with delicate bloom and tender green foliage, and it is earlier by about a week than Prunus Simonii and the Purple-leaved Plum, now just coming into flower. There is no tree like it in this neighborhood. I have no Prunus Davidiana with which to compare it in earliness of bloom.

The dull chocolate-colored flower-sprays of the little shrub, Yellow-root, Zanthorhiza apiifolia, are interesting, but neither fragrant nor showy, and the plant does not seem to thrive in our soil, as it does not spread or increase in size. It is associated with Spice-bushes and Leatherwood in the shrubbery, all of which bloom at the same time and suggest our native copses. It is therefore well to plant them together in the wilder parts of the home ground where these are of ample size. Forsythias are now in full bloom, and are, of course, the most conspicuous of early-flowering shrubs.

The Japanese Weeping Cherry is expanding its flower-buds of rich carmine, which develop into blossoms of a paler shade. The ground around our largest Weeping Cherry, which is a beautiful full-grown tree twenty feet in height and of most graceful and picturesque habit of growth, is carpeted with single Hyacinths, white, pink, buff and blue, naturalized in the grass. It is true that Hyacinths deteriorate in size of bloom when planted in this manner, nevertheless the effect of this grouping about the Weeping Cherry, with its long pendent branches clothed in delicate rose-color, is very good, and much more to our taste than the stiff rows of double-flowering Dutch Hyacinths one so often sees primly disposed on naked soil in a garden-bed.

We are now much interested in establishing a wild garden for hardy Ferns and wild flowers from the cliffs of the Potomac, which rolls past our little village, and from the neighboring country. Expeditions to these cliffs result in adding to our collection as many as eight species and varieties of Fern in a single morning. We plant them in crevices of the rocks and on and around stumps of trees, set in their native Mosses, for almost all of these Ferns grow naturally on Moss beds that cover the overhanging rocks of the river cliffs. Hepaticas

and Columbine, Rock Cress and Saxifrage and many other wild flowers are planted with the Ferns. We feel sure, among other delightful "finds," that we have discovered Sedum Neviusii, a rare plant, growing on our cliffs. This Sedum was discovered and named a generation ago by Dr. Nevius, a clergyman of Alabama, on rocky cliffs near Tuscaloosa, in that state. It has also been found—I quote from Mr. Meehan, in his *Native Flowers and Ferns of the United States*—on Salt Pond Mountain in Virginia. We are impatient for its bloom, in order that we may be sure we are not mistaken in supposing that our plant is the true species.

Delicate pink and white Rue Anemones are now blooming in our fernery in company with graceful fronds of common Polypody, beds of Walking Fern, tiny plants of Asplenium Trichomanes, A. Ruta-muraria and larger plants of the Rock Brake, Pteris atropurpurea and its near relative, Pteris gracilis. Here, also, we have our collection of Mosses of this region, but, alas, I am not enough of a botanist to know even the names of most of them. What book on American Mosses and other flowerless plants would be the most helpful to an amateur botanist who wishes to begin the study of these plants?

Rose Brake, W. Va. *Danske Dandridge.*

[On Mosses, Lesquereux's *Manual* is the standard work, and Barnes' *Key*, published by the University of Wisconsin, should go with it. On Ferns and Hepaticæ the chapters in the last edition of Gray's *Manual* or Underwood's *Native Ferns* can be consulted.—Ed.]

The Nomenclature of the Spruces and Firs.

To the Editor of Garden and Forest:

Sir,—I trust you will give me a little space in the columns of your journal for a few remarks upon the nomenclature of the Spruces and Firs, in which I am much interested, and especially so since the discussion of this subject by Mr. Jack and Professor Greene has appeared in this journal. I, in common probably with many others, have noticed the difference between the dates of publication of the genus Abies and of the species A. balsamea as given in several of our recent publications. The publication of the species is made to antedate that of the genus by twenty-one years, an oversight which is scarcely excusable in those who have made the subject of priority of publication a matter of special investigation. Professor Greene says that Duhamel published a genus Abies in 1755, but fails to state what his type was; was it limited to Abies as at present understood, to Picea, to Tsuga, or did it contain all of these genera? I trust that Professor Greene will enlighten us upon this point, as it is a most important one, for, if it does not apply to Abies as at present understood, it will necessitate a shifting of generic names and new combinations. Now, in reference to Abies Canadensis, Miller, *Dict.*, ed. 8, No. 4 (1768), I think it can be shown that it is nothing more than a synonym, pure and simple, of Pinus Canadensis, L., *Sp. Pl.*, ed. 2, 1421 (1753). In the latter work Linnæus uses the descriptive phrase, "P. foliis solitariis linearibus obtusiusculis submembranaceis," quoting as primary synonymy, "Abies foliis solitariis confertis obtusis membraneceis, *Gron. Virg.*, i., 191," and as a second synonym, "Abies foliis piceæ brevioribus, conis parvis biuncialibus laxis, Mill. *Icones*, i., t. 1" (1760). Five years later Miller published his A. Canadensis, first using Linnæus' descriptive phrase, "P. foliis . . . . submembranaceis," and adding as a second synonym his own earlier description, "Abies foliis . . . . laxis," just the same as Linnæus had done under Pinus Canadensis. Therefore, as the description and principal synonym of Abies Canadensis, Miller, is the same as for Pinus Canadensis, L., and, in fact, is mainly taken therefrom, the two names must be considered as applying to the same plant, which is the Hemlock, Tsuga Canadensis (L.), Carr. As indicated by Professor Sargent, the proper name for the White Spruce should be Picea laxa (Ehrh.), Sarg.

Detroit, Mich. *O. A. Farwell.*

Notes from Carlton Hill, New Jersey.

To the Editor of Garden and Forest:

Sir,—The sixty or more hot-houses of Mr. Julius Roehrs are near Carlton Hill, New Jersey, twelve miles out on the Erie Railroad. Much of the stock seen here last week was for the Easter trade, and many of the houses were brilliant with bloom. However, in so great an establishment much space was occupied by plants grown for other seasons. Not a few of the houses, for economy in wall-space and heating, are unseparated, except by supports of cedar posts, and eight adjoining houses, each one hundred or more feet in length, made a luxuriant field of Palms and other foliage plants. These have almost no demand now, and are the specialty for autumn trade, as plants in flower are for spring. A house of Araucarias was particularly beautiful and very thrifty, as, indeed, were all the foliage plants. The type, Araucaria excelsa, and the varieties known as Glauca and Robusta are all grown in quantity; the deep green of the older leaves and the tips of new growth of a lighter shade made a beautiful effect in the great collection of plants now three years old and imported from Belgium two years ago.

Among the less common flowering plants for Easter were a house of French Lilacs, those intended for market now about two feet high and well covered with opening trusses. Specimens of the once popular Bottle-brush, Metrosideros, were well flowered, as were trimmed plants of Bougainvillea Sanderiana, which Mr. Roehrs considers extremely useful on account of its dwarf habit and its abundant flowers, which can be forced at this season. About a dozen plants of the Rose Acacia, Robinia hispida, were observed with their deep pink flowers. The selected plants of Kalmia ready for Easter looked well to the casual observer, though Mr. Roehrs said the imported stock proved poor and unsatisfactory this season. The distinct tints of thickly flowered plants of Ghent Azaleas were conspicuous, and very densely berried plants of Ardisia crenulata made a brilliant display near the green and white of a collection of Choisya ternata. The latter has a very uncertain sale, as it is but little known. There were plants of Cytisus and of Acacia racemosa three feet high, the spiny branches closely covered with the small leaves and globular clear yellow flowers. Moss Roses, Baroness Rothschild and Ulrich Brunner Roses filled several houses and bore a plentiful supply of buds. Mr. Roehrs considers these two hybrid Roses the only ones which bloom freely enough to compete with the steadily improving Tea Roses. He remembers when Magna Charta roses were readily sold for $18.00 a dozen at wholesale for Christmas, while $6.00 is their current value in midwinter. Too many of the hybrid Roses come blind, and thus prove unprofitable, while Tea Roses bloom naturally and continuously. There is, however, no great profit in growing Baryness Rothschild and Ulrich Brunner specially for Easter, as the time cannot be accurately measured, and some of the roses are mature two weeks earlier than Easter, and must be cut, while slower plants are belated a fortnight in flowering.

Lilies, Azaleas, Rhododendrons and Hydrangeas comprised the main Easter stock. Only Lilium longiflorum was grown here this year, some 7,000 bulbs being in flower, and these tall stalks bore an average of five exceptionally large and vigorous buds. Most of the Azaleas were of medium size for use in ordinary living-rooms, though there were some large plants which will be returned by their temporary owners after the flowering season is past. Three to four thousand of these showy plants comprised all the best varieties and colors. So much time and money is necessary to grow large plants to perfection that Mr. Roehrs finds those of medium size more profitable, and they are also in greater demand. But even these have dropped one-third in price in recent years. The most showy Azaleas were plants of the brilliant carmine Le Flambeau; Siegfried, a clear scarlet with a suggestion of salmon, and almost free of marking; C. B. Brigham and Apollo, of a deeper shade; Helen Thildeman, a good double pink; Professor Walter, darker than Vervæneana and an improvement on this popular pink variety. Bernhard André alba was the best white seen here, and Raphael is a little sensitive so late in the season; these, with Garten-director of France, white, with markings of scarlet in clearly defined sections, were among the best sorts. About three hundred plants of Rhododendrons of various species were in flower. The houses of Hydrangeas were hardly less showy than those of Azaleas, and compact plants carried good heads of many-colored flowers, various shades of blue, pink, lavender and green making a unique effect.

Narcissi are sparingly grown, and most of the Tulips were white ones, the green-tipped flowers making a pleasing show in the leathery glaucous leaves. Lily-of-the-valley is one of the staple crops here, and about 100,000 pips were being forced.

Orchids are grown for cut flowers, and four houses contained resting plants of Cattleya trianæ, C. Mossiæ, C. Gaskelliana, C. labiata and Dendrobium formosum. A house of Swainsonia was observed, and a group of standard Orange-trees two feet high and coming into fruit, besides smaller Otaheite Oranges in flower. Forced hardy shrubs were once a specialty with

Mr. Roehrs, such as flowering Almonds, Deutzias and Spiræas, but their blooming season is short, so that it is difficult to have them at their best at exactly the right time, and then they do not keep longer than a few days in the buyer's hands. The lateness of Easter this year has had a favorable effect on the plants, which have been forced gradually, with no hurry, and it is always easier to hold plants back from flowering than to urge them in advance.

New York. *M. B. C.*

Notes.

New-crop limes from Jamaica, small and green, may now be had at fifteen cents a dozen, or $1.25 for 100.

A consignment of 180,000 Easter lilies arrived in this city on Sunday by the regular steamer from Bermuda.

Trailing Arbutus, from woodlands in Massachusetts and other neighboring states, is the newest offering in the up-town flower-stores, and a compact little bunch costs but twenty-five cents.

It must not be considered that the few western Senators who make most of the noise in Washington against President Cleveland's forest reserves represent the best public opinion of their section. The Senators and Representatives of California all support the reservations, and on the 27th of March the Sierra Club of San Francisco passed a series of resolutions which endorse the action of the state's delegation in Congress, favor the reservation principle and urge that as far as possible the forests thus set apart shall be policed by the army.

Professor Roberts, of Cornell University, is sending out circulars to notify whom it may concern that under the Agricultural Extension Bill the college of agriculture of that university has undertaken to assist, free of expense, all teachers who wish to introduce what is called "nature studies" into the public schools. Nature study means nothing more than seeing familiar things in a new light, and the Cornell faculty wish to encourage the investigation of common objects so as to teach accurate observation and the power of clearly expressing what is seen.

Mr. F. W. Burbidge, in an address on the culture of hardy bulbs in England, said that 100,000 Hyacinths or Narcissus may be grown on an acre of land, 115,000 to 120,000 Tulips, while of smaller plants like Crocuses, Snowdrops, Squills, Anemones, Winter Aconites, etc., the number runs up to 200,000 and 300,000 an acre. He believes that any hardy bulb which brings more than one pound a thousand in the market can be cultivated with profit in many parts of England. Professor W. F. Massey, of North Carolina, has long been of the opinion that the cultivation of bulbs could be made a successful industry in that state.

Mr. Wilhelm Miller, who is a special student of horticulture in Cornell University, has prepared a bulletin on Dahlias, which is published by the experiment station, and which is much more than a mere test of varieties although it gives the habits, form and relative value of some 350 different named varieties which were grown at Ithaca last year. In the first place, there is an interesting history of the plant and of its evolution to its present freedom and grace of outline and poise since the introduction of the Cactus Dahlia. The illustrations show some of the best forms of the flower which recent crosses have produced, and the thirty-five pages which make up the bulletin are all filled with interesting and instructive matter.

Professor Morse, of the New Hampshire Experiment Station, writes to the press of his state that ashes are now delivered in car-load lots at railroad stations at $10 a ton. This low price, however, is accompanied by a deliberate reduction in the quality of the ashes. Buyers should look with suspicion on lots which appear excessively moist, for in such cases the potash is seldom equal to the proportion in the average product. Certain samples analyzed were from burned rubbish, principally of waste paper and refuse lumber. It is a fact which should be generally known, that ashes from paper are as valueless as ashes from coal, because the soluble mineral matter has all been leached out of the paper stock during the process of manufacture.

We have already spoken of Professor Halsted's experiments with Potatoes with reference to the disease known as the scab, Oospora scabies, and a recent bulletin gives interesting details of the work of the last year. It seems to be proved that the soaking of the seed potato in a solution of corrosive sublimate will not greatly check the disease if the soil itself is infected, although if the poison is added to the soil it will check the scab. Sulphur maintained its position as the best remedy, and its wholesome effect on the soil remains undiminished through the second year, and no one knows how much longer it will prove useful. Kainit, besides being a good fertilizer, has been proved to have a considerable fungicidal value.

The Saghalien Knotweed is a strong perennial herb with creeping root-stocks, and it has been cultivated for twenty-five years in the botanical gardens of Europe. A few years ago, in time of drought in France, it was discovered that cattle would eat the leaves and tender branches of this plant, and the suggestion was made that it might prove valuable as a fodder-plant. In a year or so extravagant accounts of the value of this Polygonum Sachalinense appeared in some American seed catalogues, but the Director of the Maine Experiment Station issues a renewed warning against trusting it. It is not probable that American farmers will realize the hopes which have been raised by the glowing descriptions of this plant from Europe. We should be very glad to publish the experience of any one who has tried it.

The sweet or saccharine Sorghums are now successfully grown in almost every state and territory of the Union, and although there has been a decrease in the acreage of these Sorghums planted for the manufacture of sugar and molasses, the acreage sown for forage has increased very materially. Mr. Thomas A. Williams, the Assistant Agrostologist of the Department of Agriculture, has prepared a bulletin on Sorghum as a Forage Crop, which in the scope of twenty pages groups together the results of experiments in many of the stations and elsewhere throughout the Union. Among the facts brought out are that Sorghum endures drought better than Corn, and will do better on thin soils, being a stronger feeder; that the early varieties are preferable for forage; that the seed should not be sown until the ground becomes warm, and then plenty of it should be used in a well-prepared bed; and that irrigation should be practiced where it is possible. It is good practice to plant Cow Peas or other Legumes with the Sorghum, not only to improve the quality of the forage, but to leave the land in better condition. The crop can be used for soiling, pasture, ensilage or hay, and the best quality of hay is obtained by cutting the plant shortly after it begins to bloom. For soiling it can be cut profitably as soon as the heads are formed, while for silage it is best cut when the seed is in the "dough." Sorghum is a native of the tropics, but it is a most adaptable plant, and varieties have been developed which are perfectly hardy as far north as Canada, and every one who has a farm and reads this bulletin will be tempted to experiment with it as a forage plant.

Above 51,000 packages of fresh vegetables from the south were received in New York during last week. Besides 20,000 barrels, crates and boxes of new cabbage, peas, beans and tomatoes, there were thirty-four packages of cucumbers, 728 of lettuce, 17,318 of spinach, 12,195 of kale, 4,051 of radishes and 1,394 of asparagus. This does not include receipts of vegetables forwarded by express, but the general shipments by steamships and ordinary passenger and freight trains. Besides these domestic products, there were onions from Bermuda, Spain and Turkey, and potatoes from Scotland, Germany, Bermuda and Cuba. Asparagus now comes from North and South Carolina and Virginia, and the first cuttings are being shipped from Maryland. The white shoots cost forty-five cents, and the tender green stalks fifty-five cents a bunch in Washington Market. Beets, from Florida and South Carolina, bring ten cents a bunch, and cabbage, from the same state, ten cents a head. Celery comes from California and Florida, and cucumbers from the latter state and from Boston hothouses. Eggplants from Florida command twenty to twenty-five cents. Kale comes from Maryland and Virginia, as does spinach. Peppers are supplied by Florida, as are string-beans, lettuce, squashes and tomatoes; the latter now sell for twenty-five cents a pound. Peas, from Georgia and South Carolina, sell for seventy cents a half-peck. Radishes come from Virginia, and parsley from Bermuda; 26,500 crates of onions came from these islands last week, also 800 barrels of potatoes, which bring fifty cents a half-peck at retail. Sweet potatoes, from southern New Jersey, cost twenty-five cents a half-peck. Dandelion gathered from fields and commons brings ten cents a quart, and that which is cultivated and blanched realizes twice that price. Okra costs ten cents a dozen, and mushrooms fifty cents a pound.